

REMARKS

Entry of the foregoing and reexamination and reconsideration of the subject application, as amended, pursuant to and consistent with 37 C.F.R. § 116, are respectfully requested in light of the following remarks.

Claims 1-3 and 7-24 are pending in this application. Claims 4-6 have been cancelled.

Claim 1 has been amended change the designation of the components to recite a), b), c) and d), and to incorporate the subject matter of previous claim 6. Claims 7-9 have been amended to depend from claim 1. These claims previously depended from claim 6, the subject matter of which has been incorporated into claim 1. Claims 11, 16, 18, 20 and 24 have been amended to recite a Markush group in proper form. Claim 3, 12, 17 and 19 have been amended to recite the claims in proper claim language.

No new matter has been introduced as a result of the foregoing amendment.

35 U.S.C. § 103 Rejection

Claims 1-24 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Okada (US 2002/0051911).

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Applicants respectfully submit that the claims are not obvious over Okada.

To establish a *prima facie* case of obviousness, three basic criteria must be met. (MPEP 2143) First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

Okada relates to a curable composition for a polymer electrolyte which comprises the following constituents as an essential constituent: (A) a SiH group containing polysiloxane; (B) a compound having at least one structure selected from the group consisting of a phenylene unit, a siloxy linkage, an Si-N bond, a carbonyl

group, an amide linkage and an amino group and having two or more alkenyl groups; (C) a hydrosilylation catalyst; and (D) an electrolyte salt compound. As acknowledged in the Office Action, Okada does not disclose SiH groups on the compounds in constituent B or the alkenyl groups on compounds in constituent A. The Office Action indicates that Okada discloses the opposite, i.e. SiH groups on the compounds in constituent A and alkenyl groups on compounds in constituent B. Therefore constituent A of Okada is compared with POS (B) of the instant claims and constituent B of Okada is compared with POS (A) of the instant claims. Okada also teaches that POS with low molecular weight polyethylene oxide (PEO) on side chains have insufficient ionic conductivity, poor workability and moldability and have insufficient mechanical strength:

[0006] Further, materials derived from polysiloxanes by introduction of low-molecular PEO onto side chains thereof are described in Journal of Power Source, 20, 327 (1987), Japanese Kokai Publication Sho-63-136409 and Japanese Kokai Publication Hei-02-265927. They are, however, insufficient in ionic conductivity, are not noncrystalline, are not easy to synthesize, occur as liquids and are poor in workability or moldability, and are insufficient in mechanical strength. For these and other reasons, they have not been put to practical use.

[0007] A hydrosilylated crosslinked compound derived from a PEO side chain- and SiH group-containing polysiloxane and an olefin having polyethylene oxide in its main chain is described in Japanese Kokai Publication Hei-03-115359. However, the ionic conductivity thereof is considerably low, namely about $4.9 \times 10^{-5} \text{ S.cm}^{-1}$, and this is not satisfactory.

Okada further teaches that constituent (B) should not have any polyethylene oxide structures, in particular any polyalkyleneoxide:

[0051] It is preferred that the constituent (B) is substantially free of any polyethylene oxide structure, in particular any polyalkyleneoxide. Since the constituent (B) is a constituent for crosslinking the constituent (A) polysiloxane, the occurrence of such structure in the constituent (B) tends to decrease the ionic conductivity. (Emphasis added)

The instant claims require a POS (A) with at least one group directly bonded to a silicon atom comprising a polyoxyalkylene (Poa) ether functional group. As shown above, Okada teaches that constituent B is substantially free of any polyethylene oxide structure, in particular any polyalkyleneoxide, because the presence of the structure decreases the ionic conductivity. (See

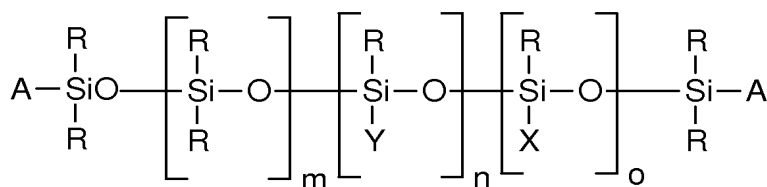
paragraph [0051]) One of ordinary skill in the art, upon reading Okada, would recognize that Okada teaches away from using a POS with at least one group directly bonded to a silicon atom comprising a polyoxyalkylene (Poa) ether functional group. "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *In re Gurley*, 27 F3d 551, 553, 31 USPQ2d 1130, 1131. (Fed. Cir. 1994) One of ordinary skill in the art of making battery electrolytes, upon reading Okada, would not be motivated to use a POS with a polyoxyalkylene (Poa) ether functional group because Okada indicates that the use of such a group is detrimental to the desired product due to decrease in ionic conductivity.

The Office Action maintains that the claims are obvious because the SiH groups of constituent A and the alkenyl groups of constituent (B) are substitutable for each other and would yield the predictable results of cross-linkable polymers that would, upon cross-linking, yield the same polymer. (see page 3, lines 9-12) Compound A of the instant claims requires at least one group directly bonded to a silicon atom comprising a polyoxyalkylene (Poa) ether functional group. Okada teaches that constituent B, which corresponds to compound A of the instant claims, has to be "essentially free of any polyethylene oxide structure, in particular any polyalkyleneoxide" otherwise there will be a decrease in ionic conductivity. One of ordinary skill in the art in the field of battery electrolytes would recognize that decreases in ionic conductivity are detrimental for the intended use. Such a person would also recognize that Okada also teaches in paragraphs [0006] and [0007] that material derived from polysiloxanes by the introduction of low molecular weight polyethylene oxides onto the side chains thereof, have insufficient ionic conductivity and have not been able to be put to practical use. Therefore Okada teaches away from the use of POS (A) as required by the instant claims. Under the rationale proposed in the Office Action, the claims of the instant invention are not obvious over Okada since a non-operable product would result.

To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. There is no suggestion or motivation in Okada to modify the composition by replacing component B in Okada with the POS (A) of the instant claims. As shown above, Okada teaches away from the use of POS (A) which comprises a polyoxyalkylene (Poa) ether functional group because the presence of such a group decreases the ionic conductivity of the final product, the battery electrolyte, which requires good ionic conductivity. Therefore, there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify Okada to obtain the applicants' invention.

To establish a *prima facie* case of obviousness, there must be a reasonable expectation of success. There cannot be a reasonable expectation of success in developing the claimed composition when the instant claims require a POS (A) having at least one group directly bonded to a silicon atom comprising a polyoxyalkylene (Poa) ether functional group. As shown above, Okada teaches that constituent B needs to be is substantially free of any polyethylene oxide structure, in particular any polyalkyleneoxide, because the presence of the structure decreases the ionic conductivity. One of ordinary skill in the art would recognize that given the teachings that a polyethylene oxide structure, in particular any polyalkyleneoxide, would be detrimental to the ionic conductivity properties of the final product. There also cannot be a reasonable expectation of success in obtaining the claimed composition, when Okada teaches against the use of an element required in the instant claims, even against the presence of the compound in small amounts. Therefore there is no reasonable expectation of success in producing the applicants' invention based on the teachings in the Okada.

To establish a *prima facie* case of obviousness, the prior art reference must teach or suggest all the claim limitations. Okada does not teach or suggest that POS (A) (which corresponds to constituent B in Okada) is an essentially linear random or block copolymer with the following mean general formula (II):



where the variables are defined and Y represents an R¹-Poa group where the R¹ symbol represents a radical comprising from 2 to 50 carbon atoms and the Poa symbol represents a group of polyoxyalkylene ether type. As shown above, Okada teaches that "it is preferred constituent B is substantially free of any polyethylene oxide structure, in particular any polyalkyleneoxide. Therefore the cited prior art does not teach or suggest all the claim limitations.

Applicants respectfully submit that claims 1-3 and 7-24 are not obvious over Okada. Applicants therefore request the withdrawal of the rejection of these claims under 35 U.S.C. §103(a).

From the foregoing, Applicants earnestly solicit further and favorable action in the form of a Notice of Allowance.

If there are any questions concerning this paper or the application in general, Applicants invite the Examiner to telephone the undersigned at the Examiner's earliest convenience.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

Date: August 24, 2011

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